Amendments to the Claims: This listing of claims will replace all prior versions, and listings, of claims in the application

Listing of Claims:

1. (Currently Amended) Method of controlling an accelerator coupled nuclear system (ACS) comprising a nuclear reactor operating in subcritical mode and a neutron generator device using a beam of ~~accelerated~~ charged particles generated by an accelerator, the neutron generator supplying ~~the~~ a quantity of external neutrons necessary to maintain the nuclear chain reaction in the core, and ~~the~~ an operating point of the system being selected more or less around ~~the~~ an optimal point at which ~~the~~ a relationship between the ~~number~~ quantity of external neutrons produced and the energy of the ~~proton~~ beam of accelerated charged particles having been used to produce them is maximum, this method being characterized in that the ~~number~~ quantity of external neutrons is adjusted depending on ~~the~~ power fluctuations of the nuclear reactor by acting on the energy of the charged particles (E_p) generated and accelerated by the accelerator.

2. (Currently Amended) Method of controlling an accelerator coupled nuclear system (ACS) in accordance with claim 1, ~~characterized in that it comprises~~ further comprising the following steps:

~~1~~*A*. determining ~~the~~ operating conditions under which it is desired to operate the nuclear reactor the determined operating conditions including: level of subcriticality (r_0), consumable power to be produced, thermal power P_{th} or electric power $P_{el} = \eta_{el}P_{th}$ where η_{el} is ~~the~~ an electric yield of the plant, quantity and kind of fuel,

~~2~~*B*. from these conditions, determining ~~the~~ operating parameters of the accelerator as follows:

~~a~~ B1 - determining ~~the~~ an optimal energy E_p^{Max} of the charged particles, which ~~verifies~~ satisfies the expression:

$$d/dE_p\ [\varphi^*(E_p)\eta_a(E_p)Y_n(E_p)/E_p] = 0 \qquad (1)$$

in which ~~E_p is the energy of~~ the incident particles have an energy E_p, ~~Y_n is~~ the reactor has a neutron yield, Y_n, ~~φ^* is the~~ and a neutron importance, φ^*, and ~~η_a is the yield of~~ the accelerator has a yield of η_a,

~~b~~ B2- selecting ~~the~~ an operating energy (nominal energy) E_p^{nom} equal to or greater than the optimal energy E_p^{Max}:

$$E_p^{nom} = E_p^{Max} + \Delta E_p,\ \Delta E_p \geq 0. \qquad (2)$$

~~c~~B3 - ~~determine the~~determining a nominal intensity I_p^{nom} of the beam of charged particles necessary to obtain ~~the~~ a nominal power of the reactor P_{th}^{nom} depending on the nominal energy E_p^{nom}, on the neutron yield $Y_n(E_p^{nom})$, on the yield of the accelerator $\eta_a(E_p^{nom})$, on ~~the~~ an average number v of fission neutrons, on ~~the~~ energy E_{fis} supplied in a fission reaction, and on the neutron importance $\varphi^*(E_p^{nom})$ for the nominal energy E_p^{nom}:

$$I_p^{nom} = r_0 \nu P_{th}^{nom}/[E_{fis}\varphi^*(E_p^{nom})Y_n(E_p^{nom})], \quad (3)$$

as well as ~~the~~ a fraction of the power produced by the reactor that is consumed by the accelerator:

$$f^{nom} = E_p^{nom} r_0 \nu/[E_{fis}\varphi^*(E_p^{nom})Y_n(E_p^{nom})\eta_a(E_p^{nom})\eta_{el}], \quad (4)$$

~~3~~C. ~~set~~ setting the fraction f of the power produced by the reactor that can be consumed by the accelerator, as well as the intensity of the incident particle beam at nominal values according to the following formulas:

$$I_p^{nom} = r_0 \nu P_{th}^{nom}/[E_{fis}\varphi^*(E_p^{nom})Y_n(E_p^{nom})], \quad (3)$$
$$f^{nom} = E_p^{nom} r_0 \nu/[E_{fis}\varphi^*(E_p^{nom})Y_n(E_p^{nom})\eta_a(E_p^{nom})\eta_{el}], \quad (4)$$

~~4~~D. ~~adjust~~ adjusting the number of external neutrons acting on the particle energy E_p with constant beam intensity, depending on the operating power fluctuations of the nuclear reactor, according to the expression determining the variation of the energy:

$$E_p = f^{nom} P_{el}\eta_a(E_p)/I_p^{nom} \quad (5)$$

3. (Currently Amended) Method of controlling an accelerator coupled nuclear system in accordance with claim 1 or 2, in which the particle energy E_p at the operating point ~~has a particle energy E_p~~ is equal to the optimal value E_p^{Max} ~~of this particle energy~~.

4. (Currently Amended) Method of controlling an accelerator coupled nuclear system in accordance with claim 1 or 2, in which the particle energy E_p at the operating point ~~has a particle energy E_p~~ is greater than the optimal value E_p^{Max} ~~of this particle energy~~.

5. (Currently Amended) Method of controlling an accelerator coupled nuclear system in accordance with claim 4, in which the particle energy E_p at the operating point ~~has a particle energy E_p~~ is equal to $E_p^{Max} + \Delta E_p$ where E_p^{Max} is the optimal value of this particle energy or where the value ΔEp is selected so as to be much greater than possible negative power fluctuations of the reactor in the normal operating mode of the reactor.

6. (Currently Amended) Method of controlling an accelerator coupled nuclear system in accordance with ~~any of the above~~ claims 1 or 2, in which the particles are protons, and the neutron generator uses ~~neutron-generating nuclear reaction is~~ a spallation reaction employing a spallation target.

7. (Original) Method of controlling an accelerator coupled nuclear system in accordance with claim 6, in which the spallation target is made of lead-bismuth, and the optimal proton energy E_p^{Max} ranges from 0.5 GeV to 2.5 GeV.

8. (Currently Amended) Method of controlling an accelerator coupled nuclear system in accordance with any of the claims 1 ~~through 4~~or 2, in which the particles are electrons, and the neutron-~~generating nuclear reaction is~~generator uses a photonuclear reaction.

9. (Currently Amended) Accelerator coupled nuclear system comprising a nuclear reactor having a core and a center of the core, the nuclear reactor operating in subcritical mode and a neutron generator device using a beam of accelerated charged particles, the neutron generator supplying ~~the~~ a quantity of neutrons necessary ~~in order~~ to maintain the nuclear reaction, ~~characterized in that~~comprising a controller for controlling the ~~number~~ quantity of neutrons induced by the accelerator ~~is controlled~~ by acting on the particle energy E_p, with constant beam intensity of the particles.

10. (Original) Accelerator coupled nuclear system in accordance with claim 9, for which the charged particles are protons directed in a beam at the center of the core, and the core comprises a spallation target.

11. (Currently Amended) Accelerator coupled nuclear system in accordance with claim 9 or 10, for which the nominal particle energy E_p is greater than ~~the~~ an optimal energy value E_p^{Max}, which ~~optimizing~~ optimizes ~~the yield of~~ the nuclear reaction ~~producing~~ yield that produces the neutrons.

12. (Currently Amended) Accelerator coupled nuclear system in accordance with ~~any of the claims 9 through 11~~claim 10, in which the ~~actual~~ target has a conversion yield and is surrounded by a buffer, ~~whose~~ having a conversion yield that is less than half of the conversion yield of the ~~actual~~ target.